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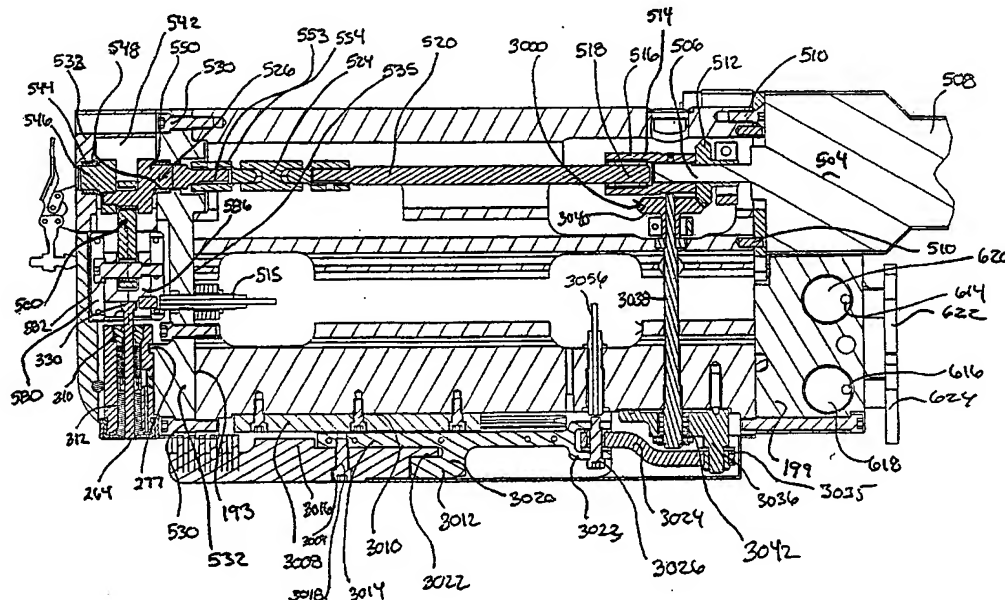
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(54) Title: **DISPENSING SYSTEM WITH MIXING MODULE MOUNT, DRIVE AND TIP TREATMENT**



What is Claimed:

1. A foam dispenser component drive mechanism comprising:
a foam dispenser component drive transmission comprising a crank and slide assembly.
2. The drive mechanism of claim 1, wherein said drive transmission includes a transmission housing and said crank and slide assembly includes a crank pivotably supported by said housing and a slide assembly.
3. The drive mechanism of claim 2 wherein said slide assembly comprises a connecting rod driven by said crank and a slide member driven by said connecting rod.
4. The drive mechanism of claim 3 wherein said slide member comprises engagement means for engagement with a reciprocating dispenser mixing module rod.
5. The drive mechanism of claim 4 wherein said engagement means comprises an engagement slot designed to receive and retain an enlarged engagement head of the mixing module rod.
6. The drive mechanism of claim 3 wherein said slide member is in sliding engagement with a guide shoe supported by said housing and of a material of a lower friction coefficient level than that of said housing.
7. The drive mechanism of claim 3 wherein said slide member is a multi-walled piston member in sliding engagement with a pair of guide shoes supported by said housing.
8. The drive mechanism of claim 3 further comprising a connection pin, said connecting rod having a first looped end in engagement with said crank and a second looped end, said connection pin extending into said second looped end and into engagement with said slide member.
9. The drive mechanism of claim 8 wherein said crank includes a first crank component and a second crank component releasably interconnected with said first crank

component, and said first and second components being detachable and interconnectable to provide for engagement of said crank with the first looped end of said connection rod.

10. The drive mechanism of claim 2 further comprising first and second bearings wherein said crank includes a first extension and a second extension, and said housing includes a first bearing reception recess receiving said first bearing and first extension and a second bearing reception recess receiving said second bearing and second extension.

11. The drive mechanism of claim 10 wherein said housing includes a main housing section and a detachable cap housing section with said main housing section defining said first reception recess and said cap housing section defining said second reception recess.

12. The drive mechanism of claim 1, wherein said drive transmission comprises a driver, and a drive shaft in line between said driver and the crank and slide assembly, with said drive shaft driving said crank and slide assembly.

13. The drive mechanism of claim 12 further comprising a flex coupling positioned in line between said drive shaft and crank and slide assembly.

14. The drive mechanism of claim 12 further comprising a one way clutch in line between said driver and crank and slide assembly.

15. The drive mechanism of claim 14 wherein said driver is reversible in drive rotation direction and said drive mechanism further comprising a secondary drive transmission which is activated/deactivated depending on direction of drive rotation.

16. The drive mechanism of claim 1 further comprising a driver and wherein said driver is a DC brushless motor.

17. The drive mechanism of claim 1 further comprising a home sensor positioned in drive transmission line for monitoring a position status of a component in said drive mechanism.

18. The drive mechanism of claim 1 further comprising a home sensor which senses a position of a component that is of said drive transmission or is driven by said drive transmission and positioned downstream of a crank in said crank and slide mechanism.

19. The drive mechanism of claim 18 further comprising a driver in driving engagement with said drive transmission and wherein said driver includes an encoder.

20. The drive mechanism of claim 1 wherein said driver includes a motor generating 10,000 lbf. of drive force on the dispenser component.

21. The drive mechanism of claim 1 further comprising a dispenser housing within which is positioned said crank and slide assembly and wherein said dispenser housing includes means for receiving a mixing module and means for feeding foam precursor chemical to said mixing module.

22. A foam dispenser drive system for a mixing module reciprocation rod, comprising:

a driver; and

means for converting a rotational drive force into a linear reciprocation drive force.

23. The drive system of claim 22 wherein said linear drive force has a linear direction coincident with a linear reciprocation of a mixing module rod reciprocated by said drive system.

24. The drive system of claim 23, wherein said means for converting a rotational drive force into a linear drive force includes a crank and slider mechanism.

25. The drive system of claim 24 wherein said crank and slider mechanism includes a sliding member with engagement means for engagement with said mixing module rod.

26. The drive system of claim 25 wherein said sliding member is a piston with a slot dimensioned for catching engagement with the mixing module rod.

27. The drive system of claim 26 further comprising a pair of guide shoes and wherein said piston is in sliding engagement with said pair of guide shoes.

28. The drive system of claim 24 further comprising a dispenser transmission housing, and wherein said crank and slider mechanism includes a crank driven by said driver, a connection rod having a first end in connection with a crank pin section of said crank and a second end in engagement with a slider member of said crank and slider mechanism.

29. An apparatus for driving a reciprocating rod of a foam dispenser mixing module, comprising:

a drive shaft;

a crank driven by said drive shaft;

5 a slider assembly driven by said crank, and

a mixing module rod engagement section.

30. The apparatus of claim 29 wherein said slider assembly comprises a slide piston and a connecting rod having a first end connected with said crank and a second end connected with said slide piston.

31. The apparatus of claim 30 wherein said engagement section includes a slotted section in said slide piston.

32. The apparatus of claim 29 further comprising one way clutch in driving engagement with said drive shaft.

33. The apparatus of claim 31 further comprising a flex coupling provided with said drive shaft.

34. An apparatus for driving a reciprocating rod of a foam dispenser having a full retraction position and a full extension position relative to a mixing module of the dispenser, comprising:

a driver;

- 5 drive transmission means with said drive transmission means being arranged to coincide maximum rod reciprocation force application coincident with the full extension and full retraction positions of the reciprocating rod.

35. A method for reciprocating a mixing module reciprocation component, comprising:

rotating a crank with a drive assembly;

driving a slide assembly with the rotating crank so as to move in linear fashion, and

- 5 moving the reciprocation component together with said slide assembly.

36. The method of claim 35 further comprising monitoring a position of said reciprocating component either directly or indirectly with a home sensor.

37. The method of claim 36 wherein said drive assembly includes a driver motor with encoder and said method further comprising using the encoder to further monitor positioning of said reciprocation component.

38. The method of claim 35 further comprising using an encoder to further monitor positioning of said reciprocation component.

39. A system for monitoring the position of a mixing module reciprocation member comprising:

a drive transmission assembly,

an encoder for monitoring movement of a component being moved by said drive

- 5 transmission assembly, and

a home sensor for monitoring movement of a component being moved by said drive transmission assembly.

40. The system of claim 39 wherein said drive transmission assembly includes a drive transmission and a drive motor with the encoder, said drive motor being in driving

engagement with said drive transmission and said home sensor being positioned for monitoring movement of a component driven by said drive transmission.

41. The system of claim 40 wherein said drive transmission includes a crank and slider mechanism.

42. A foam chemical dispenser device, comprising:
a dispenser housing, said dispenser housing having a body portion defining a mixing module reception area;

a mixing module positioner adjustably supported by said dispenser housing between a
5 mixing module hold position and a mixing module access position;

a finger releasable locking device which, when in a locking mode, locks said mixing module positioner in the hold position and when in a release mode provides for positioner adjustment to said access position.

43. The device of claim 42 wherein said finger releasable locking device is a toggle clamp.

44. The device of claim 43 wherein said toggle clamp comprises an over-the-center latch.

45. The device of claim 44 wherein said latch has an adjustable contact member.

46. The device of claim 45 wherein said adjustable contact member includes a threaded rod with elastomeric tip.

47. The device of claim 42 wherein said mixing module positioner includes a pivotable member.

48. The device of claim 47 wherein said pivotable member includes a cover plate which has a pivotable first end pivotably attached to said body portion and has a contact section spaced from the pivotable first end, said locking device extends into contact with said contact section when in the locking mode.

49. The device of claim 48 wherein said cover plate has an outer edge which forms a peripheral closure seal relative to said body portion, but for an open end region which receives the outlet end of the mixing module.

50. The device of claim 42 wherein said locking device is adjustable into different compression levels relative to a mixing module received within said reception area.

51. The device of claim 42 wherein said locking device includes an extension member that is positioned for contact with said positioner and is adjustable in position to vary force levels placed on said positioner.

52. The device of claim 51 wherein said extension member has an elastomeric tip.

53. The device of claim 51 wherein said extension member comprises a threaded section.

54. The device as recited in claim 42 further comprising retention means designed for engagement with a mixing module received in the reception area of said body portion.

55. The device as recited in claim 54 wherein said retention means includes a male/female interconnection element.

56. The device as recited in claim 55 wherein said male/female interconnection element includes a projection extending within said reception area that is dimensioned for extension into a recess formed in the mixing module.

57. The device as recited in claim 42 wherein said body portion includes at least one chemical passageway with outlet positioned for chemical communication with a mixing module chemical port when the mixing module is received within said reception area.

58. The device as recited in claim 57 further comprising a solvent passageway with outlet positioned for solvent communication with a solvent port in the mixing module when the mixing module is received within said reception area.

59. The device as recited in claim 42 further comprising a mixing module received within said reception area, said mixing module having one or more chemical ports having seal reception regions extending about said one or more chemical ports, and seals positioned within said seal reception regions which are configured to hold said seal in position relative to said mixing module, and said seals being placed in compressive contact with said main body when said positioner is in said hold position.

60. The device in claim 42 wherein said locking device is configured for one finger releasing and locking.

61. A foam chemical dispenser, comprising:
a dispenser body with a mixing module placement portion;
a pivotable door pivotably supported by said dispenser body and movable between a mixing module hold position and a mixing module access position; and
means for releasably locking said door in the hold position.

62. The dispenser of claim 61 wherein said means for releasably locking includes a toggle clamp.

63. The dispenser of claim 61 wherein said means for releasably locking includes an over-the-center latch.

64. The dispenser of claim 63 wherein said means for releasably locking includes means for adjusting a compressive force imposed by said means for releasably locking on said pivotable door.

65. The dispenser of claim 61 wherein said door includes two hinge extension areas and an aperture therebetween which forms an outlet aperture for release of chemical by said mixing module.

66. The dispenser of claim 61 wherein said dispenser further comprises a male/female positioning means for precision positioning of the mixing module relative to said placement portion.

67. The dispenser of claim 61 wherein said male/female positioning means includes a projection extending out from said dispenser body and a reception cavity formed in said mixing module.

68. The dispenser of claim 61 wherein said door and the placement region of said dispenser body each have a recessed receiving portion for each receiving a portion of the mixing module therein.

69. A foam chemical dispenser, comprising:
a dispenser housing having a mixing module reception area;
a closure device supported by said dispenser housing;
said closure device being positionable relative to said dispenser housing to hold in position a
5 mixing module received in the mixing module reception area of said dispenser; and
a latch having a first part which contacts said closure device to maintain said closure door in a mixing module hold position.

70. The dispenser as recited in claim 69 wherein said closure device is a door pivotably supported by said dispenser housing.

71. The dispenser as recited in claim 70 wherein said door has a pair of pivot legs pivotably attached to said dispenser housing and defining a mixing module dispensing outlet access port between said legs.

72. The dispenser as recited in claim 69 wherein said latch is a finger release latch.

73. The dispenser as recited in claim 69 wherein said dispenser housing has a pair of chemical passageways leading to chemical outlets at the mixing module reception area,

and said closure device is designed for contact with a mixing module received in said mixing module reception area to compress seals placed in a sealing relationship relative to the chemical outlets.

74. The dispenser as recited in claim 69 wherein said latch is an over-the-center toggle latch.

75. The dispenser as recited in claim 69 wherein said dispenser housing includes a main body and an upper cap section supported by said main body, and said latch has a first section secured to said upper cap and a closure device contact extension positioned for contact with said closure device.

76. The dispenser as recited in claim 75 said contact extension is adjustable to vary compression levels induced by said closure device on a mixing module received in said mixing module reception area.

77. A dispenser, comprising:
a dispenser housing having a chemical inlet section and a chemical outlet section;
a closure device dimensioned for contact with a mixing module positioned to receive chemical from the chemical outlet section of said dispenser housing, and wherein said closure
5 device is pivotable between a mixing module hold position and a mixing module access position.

78. The dispenser of claim 77 further comprising locking means for maintaining said closure device in the mixing module hold position.

79. The dispenser of claim 78 wherein said locking means includes a finger releasable device which is finger releasable from a maximum locking state.

80. The dispenser of claim 77 wherein said finger releasable device includes an over-the-center toggle device.

81. A method of accommodating a mixing module in a dispenser, comprising:
positioning a mixing module relative to a dispenser housing;
adjusting a closure device between a mixing module access mode and a mixing module hold
locking the closure device in hold mode by single finger activation of a locking means.

82. The method of claim 81 further comprising single finger activation of said
locking means to facilitate mixing module release relative to said dispenser housing.

83. The method of claim 81 wherein adjusting the closure device includes
pivoting the closure device while pivotably supported by the dispenser housing.

84. The method of claim 81 wherein locking the closure device includes activation
of an over-the-center latch.

85. A method of accessing a mixing module of a dispenser, comprising:
releasing a finger release locking device locking a closure device from a mixing module
locked in position mode to a mixing module access mode.

86. The method of claim 85 wherein releasing the finger release locking device
includes a finger flipping of a lever of an over-the-center toggle of said locking device.

87. The method of claim 85 wherein accessing the mixing module includes
pivoting the closure device from a mixing module contact location to a mixing module
release position.

88. A mixing module for use in a dispenser system, comprising:
a housing having a front end, a rear end and an interior opening between said front
end and rear end, and said housing having a cap covering at said front end;

a rod;

5 a mixing chamber received within said interior opening in said housing and having a
rod reception passageway which receives said rod and at least one chemical inlet conduit
opening into said rod reception passageway, and said rod being adjustably received within

said rod reception passageway and having a forward end of travel that places said rod at the front end of said housing;

- 10 said housing further comprising a solvent feed passageway which extends in a rearward to forward direction within a wall portion of said housing, said cap covering comprising an outer and an interior cap portion, which in combination define a solvent feed space at said front end with the solvent feed space extending radially inward for solvent feed to said rod upon rod positioning at said front end.

89. The mixing module of claim 88 wherein said cap covering includes a first detachable cap member having a front wall and a radially outward positioned section in contact with said interior cap component, and said interior cap component having a forward wall with a front face spaced axially in from the front wall of said first detachable cap
5 member so as to define said outer and inner cap portion combination between which solvent is free to flow radially inward to said rod.

90. The mixing module of claim 89 wherein said interior cap component is a second detachable cap member secured at the front end of said housing.

91. The mixing module of claim 90 wherein said housing includes a main housing body having a first flange member at the front end of said housing and a second flange member radially inward relative to said first flange member to define an annular solvent reception recess at the front end of said housing and into which said solvent feed passageway opens.

92. The mixing module of claim 91 wherein said interior cap component has a portion which covers over the annular solvent reception recess, and said interior cap component has one or more solvent flow through openings which are positioned to feed solvent from said solvent reception recess to the solvent feed space provided by said outer
5 and interior cap portion combination.

93. The mixing module of claim 92 wherein said interior cap component has a plurality of said solvent flow through openings circumferentially spaced about said interior cap component.

94. The mixing module of claim 89 wherein the forward wall of said interior cap component has a converging front wall portion which extends radially in to form an axial minimum thickness rod reception edge up to or past which said rod extends during reciprocating travel of said rod in said rod passageway.

95. The mixing module of claim 88 wherein said cap covering includes an outer front end cap component and an interior front end cap component positioned axially interior to said outer front end cap component, with said outer front end cap component being threadably secured to said interior front end cap component, and said interior front end cap component being threadably received by a forward end of a main body of said housing.

96. The mixing module of claim 88 wherein said mixing chamber is formed of a cold flow block of material and said rod is sized for reciprocation within said cold flow material.

97. The mixing module of claim 96 first comprising a compression device which compresses said cold flow block of material toward the front end of said front end cap.

98. The mixing chamber of claim 97 further comprising a spacer positioned between said compression device and said cold flow block of material and said spacer having an axially extending section with a plurality of solvent flow through spaces circumferentially spaced about said axially extending section.

99. The mixing module of claim 88 wherein said housing includes a solvent reception cavity into which said solvent feed passageway opens and which feeds solvent to said feed passageway, with said solvent feed passageway extending entirely within the interior of the housing wall from said solvent reception cavity to said cap covering.

100. The mixing module of claim 99 wherein said solvent feed passageway extends parallel with a central axis of said rod passageway over a full axial length of said solvent feed passageway, and
said mixing module further comprising a solvent port formed in said housing and opening
5 into said solvent reception cavity.

101. The mixing module of claim 88 wherein said cap covering includes an outer front cap component which is releasably secured relative to said housing and has a rod reception aperture formed in a forward wall portion, and said cap covering further comprising an interior front cap component which is positioned axially behind said outer front cap
5 component to form said outer and interior cap portion combination for solvent passage and is also releasably secured relative to said housing and said interior front cap component, and said interior front cap component also has a rod reception aperture formed in a forward wall of said interior front cap component.

102. The mixing module of claim 101 wherein said front cap is threadably received on said interior front cap component and said interior front cap component is threadably received on a body portion of said housing.

103. The mixing module of claim 101 wherein the rod reception aperture of said outer front cap component is larger than said rod reception aperture of said interior front cap component.

104. A mixing module for use in foam dispenser, comprising:
a housing having a forward and a rearward end and an interior opening;
a cold flow material block received within the interior opening of said housing having
a rod passageway formed in said material block;

5 a front cap assembly supported on the forward end of said housing and having an outer front cap and an interior front cap component with said outer front cap being releasably secured relative to said housing;

a compression device positioned so as to bias said cold flow block toward the forward end of said housing; and

10 a solvent passageway which feeds into a solvent pool region formed between axially separated wall portions of said outer front cap and interior front cap component, with said solvent pool region opening out to an area at the forward end of said housing where said rod reciprocates.

105. The mixing module of claim 104 wherein said interior front cap component is a front cap releasably supported relative to said support.

106. The mixing module of claim 104 wherein said outer front cap is threadably attached to said interior front cap component and said interior front cap is a front cap threadably attached to the front end of said housing.

107. A dispenser tip management system, comprising:
a housing having a front end and a rear end and an internal cavity and a capped forward end;
a fluid reception chamber received within said internal cavity and having a rod passageway extending therein and at least one chemical reception passageway opening into
5 said rod passageway; and

a rod received within said rod passageway;

and a solvent supply means which feeds solvent to a space formed between axially spaced radially extending portions of said capped forward end.

108. The management system of claim 107 further comprising means for physically contacting said forward capped end to clean build up of dispensed material on said forward capped end.

109. The management system of claim 108 wherein said means for physically contacting includes a reciprocating cleaning member driven by a driver.

110. The management system of claim 109 wherein said cleaning member is a brush with bristles.

111. The management system of claim 109 further comprising a transmission between said driver and cleaning member and said transmission including a crank device which converts rotational energy to linear energy.

112. The management system of claim 109 further comprising control means associated with said driver for preventing contact of said cleaning member with said capped forward end at a time when said chemical reception passageway is open relative to said rod passageway so as to allow for chemical dispensing.

113. The management system of claim 109 further comprising means for reciprocating the rod in said rod passageway and wherein said driver driving said rod is also the same driver driving said cleaning member.

114. The management system of claim 113 wherein said means for reciprocating includes a rod reciprocation transmission line which includes a one way clutch between said driver and said rod, and further comprising a cleaning member transmission line between said driver and cleaning member and said cleaning member transmission line including a one way
5 clutch therein which is independent of the one way clutch of said rod reciprocation transmission line.

115. The management system of claim 109 further comprising compression means for biasing said fluid reception chamber toward the forward capped end of said housing.

116. A tip management system comprising:

a housing having a front end and a rear end and an internal cavity and a capped forward end;

a fluid reception chamber received within said internal cavity and having a rod
5 passageway extending therein and at least one chemical reception passageway opening into
said rod passageway;

a rod received within said rod passageway; and

means for moving a cleaning member between a cleaning position in contact with the
capped forward end of said housing and a retracted position.

117. The system of claim 116 wherein said means for moving reciprocates said
cleaning member and said cleaning member includes a brush member having bristles
designed for contact with the capped end of said housing.

118. The system of claim 116 further comprising a solvent feed passageway which
opens out at said capped end to supply solvent to said rod passing through an aperture formed
in said capped end.

119. The system of claim 118 wherein said capped end includes a double wall with
solvent clearance space therebetween which solvent clearance space opens out for solvent
contact with said rod.

120. The system of claim 119 wherein said capped end includes a front cap and an
interior cap with each being releasably secured relative to the front end of said housing.

121. The system of claim 116 further comprising a transmission between said driver
and cleaning member and said transmission including a crank device which converts
rotational energy to linear energy.

122. The system of claim 121 further comprising control means associated with said
driver for preventing contact of said cleaning member with said capped forward end at a time
when said chemical reception passageway is open relative to said rod passageway allowing
for chemical dispensing.

123. The management system of claim 116 further comprising means for reciprocating the rod in said rod passageway and wherein said driver driving said cleaning member is also the same driver driving said means for reciprocating the rod in said rod passageway.

124. A tip management system for use with a foam dispensing system having a mixing module, comprising:

means for supplying solvent to a chemical outlet end of said mixing module; and

5 means for physically contacting the outlet end of said mixing module with a cleaning member that is driven by a driver into a cleaning contact position and into a retracted position relative with the outlet end of said mixing module.

125. The system of claim 124 wherein said means for physically contacting includes a transmission between said driver and said cleaning member and having a crank member in said transmission.

126. The system of claim 125 wherein said cleaning member is a brush with contact bristles.

127. The system of claim 124 wherein said means for supplying solvent includes a solvent source of a quantity sufficient for a flushing replenishment supply of an open solvent passageway extending within said mixing module and opening out at a capped end of said mixing module.

128. The system of claim 127 further comprising a solvent pump in line between said solvent source and said open solvent passageway and said solvent pump is a fixed volume metering pump.

129. The system of claim 128 wherein said pump generates in excess 25 psi in metering a fixed volume of solvent.

130. A mixing module for use in a foam dispensing system, comprising:

a housing having an open rear end and an open front end;

a mixing chamber received within said housing and having a rod passageway and a chemical feed passageway formed therein;

5 a releasable back cap releasably secured to said housing for closing off the open rear end of said housing and a front cap covering releasably secured to said housing, and said front cap covering,

including a first cap component releasably secured to said housing and a second cap component releasably supported by said housing.

131. A method of maintaining an outlet tip of a dispensing mixing module clean, comprising:

providing solvent to a solvent passageway in a housing of said mixing module having a front cap with a dispensing outlet and a reciprocable rod received in said module such that
5 said solvent flows through a passageway which extends axially within a wall portion of said housing and which feeds a solvent pool area formed within an interior chamber defined by said front cap.

132. The method of claim 131 further comprising providing means for physically wiping the outlet end of said mixing module, which means includes a driver and a cleaning
10 member driven by said driver into and out of contact with said mixing module.

133. A mixing module comprising:

a housing having an interior cavity;

a mixing chamber received within the interior cavity of said housing;

a rod which is dimensioned for reciprocation in a passageway formed in said housing;

5 at least one chemical inlet port formed in said mixing chamber; and

a solvent filling port formed in said housing and having a releasable solvent chamber closure cap engaged with said port.

134. The mixing module of claim 133 wherein said housing further includes a solvent flow feed port which opens into said interior cavity and is spaced from said solvent filling port.

135. The mixing module of claim 134 wherein said mixing chamber is formed of a cold flow material, and said mixing module further comprising said compression means biasing said mixing chamber forward against a capped end of said housing and a spacer received within being positioned axially between said compression means and mixing chamber and having an interior solvent pocket and access ports or slots opening into said solvent pocket.

136. A mechanical dispenser tip cleaning assembly, comprising:
a driver;
a transmission
a reciprocable direct tip contact member which is in driving engagement with said transmission and is movable between a tip cleaning contact mode and a less contact with tip mode.

137. The assembly of claim 136 wherein said contact member includes a brush.

138. The assembly of claim 136 wherein said transmission is part of a transmission line engaged with a reciprocating chemical in-feed valving device.

139. The assembly of claim 138 wherein said transmission line includes means for precluding the contact member entering into the tip cleaning contact mode when said valving device is open for chemical flow out of the dispenser.

140. The assembly of claim 136 wherein said drive includes an encoder for monitoring position of said contact member.

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